UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,138	03/31/2004	Georgios Palaskas	884.B88US1	9210

21186 7590 07/27/2007
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER	
MATIN, NURUL M	
ART UNIT	**PAPER NUMBER**
2611	

MAIL DATE	DELIVERY MODE
07/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/815,138	PALASKAS ET AL.	
	Examiner	Art Unit	
	Nurul M. Matin	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *7,8,14,15,23,24,30 and 31* is/are allowed.

6)☒ Claim(s) *1-6,9-13,16-22,25-29 and 32-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/09/2007*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. This office action is in response to communications filed on June 21st, 2007. Claims 43-45 have been cancelled. Claims 1-42 are pending in this application.

2. The amendment filed on June 21st, 2007 overcomes the following objection/rejection of the last Office Action:

   a. Objection to the claims 7- 8, 14-15, 23-24, 30- 31 for being dependent on the independent claim.

3. Applicant's arguments with respect to claim 1,17, 32, 36, 40 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6, 9, 16-22, 25, 32, 34-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lehning et al, US 2005/0107059 in view of Mo et al, US 7187916 and further in view of Jerng, US 2005/0148304.

Re claim 1, Lehning discloses a method of reducing offsets of a transceiver comprising: measuring receiver amplitude and phase mismatches of receiver radio-frequency (RF) circuitry by performing a fast Fourier transform (FFT) on a receiver calibration signal (figs, 2, 5, 15, 16, page 7, Para [0110], page 6, Para [0087], Para [0088], "the invention is provided, an apparatus for improving signal mismatch compensation, introducing a mismatch of the receiver LPFs, which is represented on figs. 15 and 16. In QPSK mode, when mismatch is not compensated, the received constellation after channel compensation. When transmit pre-compensation and receive compensation are applied, the constellation is represented on FIG. 18 and the rms vector error is -36 dB. Therefore, thanks to compensation and pre-compensation techniques, analog I-Q can be used to get transmission modes requiring more than 30 dB signal to noise ratio; After the estimation has been performed, each received data packet can be compensated after the FFT by multiplying each pair (R(i),R(-i)) of sub-carriers by M.sub.R(i) to obtain a pair of mismatch compensated sub-carriers after"). But Lehning fails to explicitly disclose that the applying receiver amplitude and phase offsets to substantially offset the receiver mismatches; applying a transmitter calibration signal; and measuring transmitter amplitude and phase mismatches of transmitter RF circuitry by performing an FFT on the transmitter calibration signal. However, Mo does teach applying receiver amplitude and phase offsets to substantially offset the receiver mismatches; applying a transmitter calibration signal (co1.4, line 57-60 & co1.5, line 10-14, "The digital outputs of the ADCs 38a and 38b are provided to a digital correction block 40, which performs real-time I/Q mismatch correction (post-distortion) by using the

coefficients computed. The data is corrected in correction block 44, which performs real-time I/Q mismatch correction (pre-distortion) by using the coefficients (calibration parameters) computed during an initial calibration cycle"); and measuring transmitter amplitude and phase mismatches of transmitter RF circuitry by performing an FFT on the transmitter calibration signal (col.5, line 42-54, "Using the programming signal 50, to components in the transceiver to minimize or compensate for problems, such as I/Q mismatches. The programming signals 50 can control the calibration paths needed for I/Q mismatch calibration. Processor 18 preferably has the capability of real-time digital pre-distortion and post-distortion in blocks 44 and 40, respectively, which is needed for compensation of transmitter and receiver I/Q mismatch"). But Lehning and Mo fail to disclose wherein measuring the receiver amplitude and phase mismatches comprises measuring an image component of the receiver calibration signal, and wherein measuring the transmitter amplitude and phase mismatches comprises measuring an image component of the transmitter calibration signal. However, Jerng does teach measuring the receiver amplitude and phase mismatches comprises measuring an image component of the receiver calibration signal, and wherein measuring the transmitter amplitude and phase mismatches comprises measuring an image component of the transmitter calibration signal (abstract, "A method is disclosed to correct the IQ mismatch of an RF transceiver (which is transmitter and receiver). The method generates a reference signal down a transmitting-receiving loop and measures the received signals S.sub.DTA-1 and S.sub.DTA-2, respectively dominated by their desired component and image component").

Therefore, taking the combined teaching of Lehning, Mo and Jerng as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the arrangement of applying receiver amplitude and phase offsets to substantially offset the receiver mismatches; applying a transmitter calibration signal; and measuring transmitter amplitude and phase mismatches of transmitter RF circuitry by performing an FFT on the transmitter calibration signal as thought in Mo into Lehning to minimize the crosstalk and externally induced noise. And also the arrangement of measuring the receiver amplitude and phase mismatches comprises measuring an image component of the receiver calibration signal, and wherein measuring the transmitter amplitude and phase mismatches comprises measuring an image component of the transmitter calibration signal as thought in Jerng into Lehning and Mo for correction of in –phase quadrature signal mismatch in a radio frequency transceiver.

Re claim 2, Lehning, Mo and Jerng references teach the method of claim 1 further comprising prior to applying the transmitter calibration signal, coupling an output of transmitter RF circuitry to an input of the receiver RF circuitry, and Mo references also teaches the receiver amplitude and phase offsets is performed concurrently with the applying the transmitter calibration signal to measure the transmitter amplitude and phase mismatches (co1.9, line 12-29).

Re claim 3, Lehning, Mo and Jerng references teach the method of claim 2 and Jerng reference also teaches the image component of the receiver calibration signal is measured after performing an FFT on the receiver calibration signal at an output of the receiver RF circuitry, and wherein the image component of the transmitter calibration

signal is measured after performing an FFT on the transmitter calibration signal at the output of the receiver RF circuitry, and wherein the image component of the receiver calibration signal results from mismatches in the receiver RF circuitry and image component of the transmitter calibration signal results from mismatches of the transmitter RF circuitry(see abstract).

Re claim 4, Lehning, Mo and Jerng references teach the method of claim 3 further comprising: and Lehning reference also teaches generating the receiver amplitude and phase offsets based on the measured receiver amplitude and phase mismatches; and generating transmitter amplitude and phase offsets based on the transmitter amplitude and phase mismatches (figs. 15, 16, page 7, Para [0110].

Re claim 5, Lehning, Mo and Jerng references teach the method of claim 4 wherein the transmitter amplitude and phase offsets are applied to transmit frequency-domain signals in a signal path before performing an inverse FFT (IFFT) on transmitter signals provided to the transmitter RF circuitry, and Lehning reference also teaches the receiver amplitude and phase offsets are applied to receiver frequency-domain signals in a signal path after performing an FET on signals provided by the receiver RF circuitry(page 2, Para [0019] & page 5, Para [0077].

Re claim 6, Lehning, Mo and Jerng references teach the method of claim 4 wherein the transmitter amplitude and phase offsets are applied to transmit time-domain signals in a signal path after performing an inverse FFT (FFT) on transmitter signals provided to the transmitter RF circuitry, and Lehning references also teaches the receiver amplitude and phase offsets are applied to receiver time-domain signals in a

signal path before performing an FFT on signals provided by the receiver RF circuitry(page, 1, Para [0009] & page 5, Para [0077].

Re claim 9, Lehning, Mo and Jerng references teach the method of claim.1 further comprising applying the receiver calibration signal to an input of receiver RF circuitry, and Mo reference also teaches the receiver calibration signal is applied either prior to or concurrently with the measuring the receiver amplitude and phase mismatches (col.9, line 12-29).

Re claim 16, Lehning, Mo and Jerng reference teaches the method of claim 1 wherein the transceiver is a multi-carrier transceiver which communicates a multi-carrier signal comprising a plurality of symbol-modulated sub-carriers, and Mo reference also teaches the measuring the receiver mismatches, the applying the receiver offsets, the applying the transmitter calibration signal (col.9, line 34-38, 56-59 & co1.5, line 49-54), and Lehning reference also teaches the measuring the transmitter mismatches are performed for sub-carriers of the plurality(page 7, Para [0110] & [0104]).

Re claims 17-19, which claim the same subject matter as recited in claims 1-3. Therefore, claims 17-19 have been analyzed and rejected with respect to claims1-3.

Re claims 20-22, which claim the same subject matter as recited in claims 3-6. Therefore, claims 20-22 have been analyzed and rejected with respect to claims 3-6.

Re claim 25, which claim the same subject matter as recited in claim 9. Therefore, claim 25 has been analyzed and rejected with respect to claim 9.

Re claim 32, Lehning discloses a multi-carrier receiver comprising: fast Fourier transform (FFT) circuitry to perform FFTs on output signals from the receiver RF

circuitry (page 5, Para [0082] & page 6, Para [0087]; calibration circuitry to measure amplitude and phase mismatches of the receiver RF circuitry based on outputs of the FFT circuitry (page 7, Para [0110]. But Lehning fail to disclose that a receiver RF circuitry; the receiver offset correction circuitry to apply receiver amplitude and phase offsets to the receiver output signals to substantially offset the measured amplitude and phase mismatches in the receiver RF circuitry, and wherein the calibration circuitry measures the amplitude and phase mismatches by measuring an image component of a receiver calibration signal. However, Mo does teach a receiver RF circuitry; the receiver offset correction circuitry to apply receiver amplitude and phase offsets to the receiver output signals to substantially offset the measured amplitude and phase mismatches in the receiver RF circuitry (co1.3, line 46-47, "a radio frequency (RF) transceiver 16 and also co1.5, line 49-54). But Lehning and Mo fail to disclose the calibration circuitry measures the amplitude and phase mismatches by measuring an image component of a receiver calibration signal. However, Jerng does teach the calibration circuitry measures the amplitude and phase mismatches by measuring an image component of a receiver calibration signal (see abstract)..

Therefore, taking the combined teaching of Lehning, Mo and Jerng as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the arrangement of a receiver circuitry; receiver offset correction circuitry to apply receiver amplitude and phase offsets to the receiver output signals to substantially offset the measured amplitude and phase mismatches in the receiver RF circuitry as thought in Mo into Lehning to minimize the crosstalk and externally induced noise. And also the

arrangement of the calibration circuitry measures the amplitude and phase mismatches by measuring an image component of a receiver calibration signal as thought in Jerng into Lehning and Mo for correction of in –phase quadrature signal mismatch in a radio frequency transceiver.

Re claims 34-35, 38-39, which claims the same subject matter as, recited in claims 5-6.

Therefore, claims 34-35, 38-39 have been analyzed and rejected with respect to claims 5-6.

Re claim 36, Lehning discloses a multi-carrier transmitter comprising: inverse fast Fourier transform (IFFT) circuitry to perform IFFTs on signals for transmission by the transmitter RF circuitry (page 1, Para [0009]; calibration circuitry to measure amplitude and phase mismatches of the transmitter RF circuitry based on outputs of fast Fourier transform (FFT) circuitry (page 7, Para [0110]). But Lehning fails to disclose transmitter RF circuitry and transmitter offset correction circuitry to apply transmitter amplitude and phase offsets to transmitter signals to substantially offset the measured amplitude and phase mismatches in the transmitter RF circuitry, and wherein the calibration circuitry measures the amplitude and phase mismatches by measuring an image component of a transmitter calibration signal. However, Mo does teach transmitter RF circuitry (co1.3, line 46-47, "a radio frequency (RF) transceiver") and transmitter offset correction circuitry to apply transmitter amplitude and phase offsets to transmitter signals to substantially offset the measured amplitude and phase mismatches in the transmitter RF circuitry (co1.3, line 46-47, " a radio frequency (RF) transceiver 16 and also col.5,

line 49-54). But Lehning and Mo fails to disclose the calibration circuitry measures the amplitude and phase mismatches by measuring an image component of a transmitter calibration signal. However, Jerng does teach the calibration circuitry measures the amplitude and phase mismatches by measuring an image component of a transmitter calibration signal (see abstract).

Therefore, taking the combined teaching of Lehning, Mo and Jerng as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the arrangement of the transmitter RF circuitry and transmitter offset correction circuitry to apply transmitter amplitude and phase offsets to transmitter signals to substantially offset the measured amplitude and phase mismatches in the transmitter RF circuitry as thought in Mo into Lehning to minimize the crosstalk and externally induced noise. And also the arrangement of the calibration circuitry measures the amplitude and phase mismatches by measuring an image component of a transmitter calibration signal as thought in Jerng into Lehning and Mo for correction of in –phase quadrature signal mismatch in a radio frequency transceiver.

Re claim 37, Lehning, Mo and Jerng reference teach the transmitter of claim 36 further comprising: and Lehning reference also teaches a sub-carrier modulator, and wherein the calibration circuitry applies a transmitter calibration control signal to the sub-carrier modulator, the sub-carrier modulator to generate a transmitter calibration signal, and the, calibration circuitry to measure the amplitude and phase mismatches of the transmitter RF circuitry based on the transmitter calibration signal (figs.15& 16, page 1, Para [0009], a [0010].

Re claim 40, Mo discloses a system comprising: a substantially omnidirectional antenna (co1.3, line 45-46, "system 10 includes one or more antennas 12"); a transceiver to communicate signals with the antenna (col.3, line 46-47, "a radio frequency (RF) transceiver 6"), the transceiver comprising: and receiver offset correction circuitry to apply receiver amplitude and phase offsets to substantially offset the receiver mismatches (co1.5, line 49-54). But Mo fails to disclose a calibration circuitry to measure receiver amplitude and phase mismatches of receiver radio-frequency (RF) circuitry from a fast Fourier transform (FFT) on a receiver calibration signal; wherein the calibration circuitry measures transmitter amplitude and phase mismatches of transmitter RF circuitry from an FFT on a transmitter calibration signal, and wherein the calibration circuitry measures the receiver amplitude and phase mismatches by measuring an image component of the receiver calibration signal, and wherein the calibration circuitry measures the transmitter amplitude and phase mismatches by measuring an image component of the transmitter calibration signal. However, Lehning does teach a calibration circuitry to measure receiver amplitude and phase mismatches of receiver radio-frequency (RF) circuitry from a fast Fourier transform (FFT) on a receiver calibration signal; wherein the calibration circuitry measures transmitter amplitude and phase mismatches of transmitter RF circuitry from an FFT on a transmitter calibration signal (figs. 15 &16, page 7, Para [0110]). But Mo and Lehning fails to disclose the calibration circuitry measures the receiver amplitude and phase mismatches by measuring an image component of the receiver calibration signal, and the calibration circuitry measures the transmitter amplitude and phase

mismatches by measuring an image component of the transmitter calibration signal. However, Jerng does teach the calibration circuitry measures the receiver amplitude and phase mismatches by measuring an image component of the receiver calibration signal, and the calibration circuitry measures the transmitter amplitude and phase mismatches by measuring an image component of the transmitter calibration signal (see abstract, “A method is disclosed to correct the IQ mismatch of an RF transceiver (which is transmitter and receiver). The method generates a reference signal down a transmitting-receiving loop and measures the received signals S.sub.DTA-1 and S.sub.DTA-2, respectively dominated by their desired component and image component”).

Therefore, taking the combined teaching of Mo and Lehning and Jerng as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the arrangement of the a calibration circuitry to measure receiver amplitude and phase mismatches of receiver radio-frequency (RF) circuitry from a fast Fourier transform (FFT) on a receiver calibration signal; wherein the calibration circuitry measures transmitter amplitude and phase mismatches of transmitter RF circuitry from an FFT on a transmitter calibration signal as thought in Lehning into Mo to eliminate errors arising from mismatch characteristics of active and passive devices by improving signal mismatch compensation. And the arrangement of the calibration circuitry measures the receiver amplitude and phase mismatches by measuring an image component of the receiver calibration signal, and the calibration circuitry measures the transmitter amplitude and phase mismatches by measuring an image component of the transmitter

calibration signal as thought in Jerng into Mo and Lehning for correction of in –phase quadrature signal mismatch in a radio frequency transceiver.

Re claims 41-42, which claim the same subject matter as recited in claim 2-3. Therefore, claims 41-42 has been analyzed and rejected with respect to claim 2-3.

3. Claims 10-12, 26-28, 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lehning et al, US 2005/0107059, Mo et al, US 7187916, Jerng, US 2005/0148304 in view of Andersson et al, US 6339399.

Re claim 10, Lehning, Mo and Jerng reference fail to teach the receiver calibration signal comprises applying a substantially pure single tone sinusoid radio frequency (RF) receiver calibration signal to the input of the receiver RF circuitry. However, Andersson does (col. 6, line 15-23).

Therefore, taking the combined teaching of Lehning, Mo and Jerng as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the arrangement of the receiver calibration signal comprises applying a substantially pure single tone sinusoid radio frequency (RF) receiver calibration signal to the input of the receiver RF circuitry as thought in Andersson into Lehning and Mo and Jerngt so that the communication system can be accomplished in an easy and cost efficient way, essentially without disturbing the normal traffic in the communication system.

Re claim 11, Lehning, Mo, Jerng and Andersson references teach the method of claim 10 and Lehning reference also teaches the receiver calibration signal is generated

by calibration voltage controlled oscillator (page 4, Para [0063] and Mo reference also teaches synthesizer circuitry (col. 10, line 1-4).

Re claim 12, Lehning, Mo, Jerng and Andersson references teach the method of claim 10 and Lehning reference also teaches the receiver calibration signal is generated by a replica of a voltage controlled oscillator of the transmitter RF circuitry with a frequency offset (page 4, Para [0063]).

Re claims 26-28, which claim the same subject matter as recited in claim 10-12. Therefore, claims 26-28 have been analyzed and rejected with respect to claim 10-12.

Re claim 33, which claim the same subject matter as recited in claim 11. Therefore, claim 33 has been analyzed and rejected with respect to claim 11.

4. Claims 13 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lehning et al, US 2005/0107059, Mo et al, US 7187916, Jerng, US 2005/0148304, Andersson et al, US 6339399 in view of Rhee et al, US 20030227989.

Re claim 13, Lehning, Mo, Jerng and Andersson fail to teach the receiver calibration signal is generated by a delay-locked loop combining phases of a voltage controlled oscillator of the transmitter RF circuitry. However, Rhee does (page 2, Para [0031] and [0033]).

Therefore, taking the combined teaching of Lehning, Mo, Jerng, Andersson and Rhee as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the arrangement of the receiver calibration signal is generated by a delay-

locked loop combining phases of a voltage controlled oscillator of the transmitter RF circuitry as thought in Rhee into Lehning, Mo, Jerng and Andersson to recover, data from a data stream (summer of the invention).

Re claim 29, which claim the same subject matter as recited in claim 13. Therefore, claim 29 has been analyzed and rejected with respect to claim 13.

Allowable Subject Matter

5. Claims 7- 8, 14- 15, 23- 24, 30-31 are allowable.

The following is an examiner's statement of reasons for allowance:

The allowable subject matter in claims 7, 14, 15, 23, 30, 31 pertains a method of reducing offsets of a transmitter comprising: coupling a limiter between an output of the transmitter RF circuitry and an input of receiver RF circuitry, the limiter to generate a receiver- transmitter calibration signal based on an output RF signal of the transmitter RF circuitry, the receiver-transmitter calibration signal having a non-image component, an image component and a main component, wherein the transmitter amplitude and phase mismatches are measured by performing the FFT on the receiver-transmitter calibration signal based on the non-image component, the FFT to separate the image component, the non-image component and the main component. And applying the transmitter calibration signal comprising a single tone complex sinusoid generated by a subcarrier modulator, and wherein the method further comprises injection locking a voltage controlled oscillator at an output of the transmitter RF circuitry with the transmitter calibration signal to generate a low- image signal at the output of the

transmitter RF circuitry. and the method is performed by a first communication station, and wherein after generating both the transmitter and receiver amplitude and phase offsets, the method further comprises: applying the transmitter amplitude and phase offsets to a transmit signal comprising transmit frequency-domain signals before performing an IFFT on the transmit frequency-domain signals; RF modulating and transmitting the transmit signal to a second communication station; receiving and RF demodulating a received signal received from the second communication station; and applying the receiver amplitude and phase offsets to receive frequency-domain signals comprising the received signal after performing an FFT on the received signal.

Claim 8 is dependent on claim 7.

Therefore, claim 8 is allowable for the same reason as for claim 7.

Claim 24 is dependent on claim 23.

Therefore, claim 24 is allowable for the same reason as for claim 23.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nurul M. Matin whose telephone number is 571-270-1188. The examiner can normally be reached on mon-fri (7:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nurul Matin
Assistance Examiner, Art Unit # 2611.

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER